

AMENDMENTS TO THE CLAIMS

1. **(Currently amended)** A process for obtaining a composite material comprising at least one polymer matrix obtained by polymerization of a monomer referred to as a “monomer of interest” into a polymer, referred to as a “polymer of interest”, in the presence of carbon nanotubes homogeneously dispersed in said polymer matrix, said process comprising:

- using said carbon nanotubes as catalysis support to bind homogeneously at the surface thereof a cocatalyst/catalyst couple so as to form a catalytic system, wherein ;
- ~~activating said catalytic system is rendered active for polymerization; and~~
- polymerizing said monomer at the surface of the carbon nanotubes using said active catalytic system, the polymerization being allowed to progress over time so as thus to obtain said polymer matrix around said carbon nanotubes, as the polymerization of said monomer proceeds.

2. **(Previously presented)** The process according to Claim 1, further comprising the following steps:

- preparing a suspension of carbon nanotubes in an inert solvent;
- pretreating said carbon nanotubes by adding said cocatalyst, so as to obtain a suspension of pretreated carbon nanotubes in which the cocatalyst is adsorbed onto the surface of the carbon nanotubes;
- preparing a reaction mixture from the suspension of carbon nanotubes thus pretreated, by adding the catalyst and circulating a flow of monomer in said suspension of pretreated nanotubes, so as to bring about in said reaction mixture the polymerization of said monomer at the surface of said nanotubes and thus to form the composite material, in which said carbon nanotubes are coated with said polymer of interest;
- stopping the polymerization reaction when the polymerization in the reaction mixture has reached a rate of polymerization of between about 0.1% and about 99.9%.

3. **(Previously presented)** The process according to Claim 1, wherein said monomer is an olefin and said polymer of interest is a polyolefin.

4. **(Previously presented)** The process according to Claim 1, wherein said monomer of interest is selected from the group consisting of ethylene, propylene, copolymers thereof with

alpha-olefins, conjugated alpha-diolefins, styrene, cycloalkenes, norbornene, norbornadiene, cyclopentadiene, and mixtures thereof.

5. **(Previously presented)** The process according to Claim 3, wherein said polymer of interest is polyethylene.

6. **(Previously presented)** The process according to Claim 1, wherein the cocatalyst/catalyst couple and the experimental parameters are chosen in such a way that the catalyst can be immobilized at the surface of the carbon nanotubes by means of the cocatalyst in order to thus form the catalytic system.

7. **(Currently amended)** The process according to Claim 1 wherein the catalyst is capable of catalysing the polymerization of the monomer of interest and is selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, and Brookhart complexes based on Ni (II), Pd (II), and mixtures thereof, wherein said hindered amidoaryl chelates and said hindered oxoaryl chelates are sterically hindered or are chemically bound and the geometrical conformation of the chelates is thereby constrained.

8. **(Previously presented)** The process according to Claim 1, wherein the cocatalyst is methylaluminumoxane or a chemically modified methylaluminumoxane, or a mixture thereof.

9. **(Previously presented)** The process according to Claim 1, wherein the cocatalyst/catalyst catalytic couple is the methylaluminumoxane/Cp*₂ZrCl₂ couple.

10. **(Previously presented)** The process according to Claim 1, wherein the amount of catalyst is between about 10⁻⁶ and about 10⁻⁵ mol/g of carbon nanotubes.

11. **(Currently amended)** The process according to Claim 1, wherein the amount of cocatalyst in the reaction mixture is between about 10⁻³[[⁻³]] and about 10⁻²[[⁻²]] mol/g of carbon nanotubes.

12. **(Previously presented)** The process according to Claim 2, wherein the temperature of the reaction mixture is between 25° and 140°C.

13. **(Previously presented)** The process according to Claim 2, wherein the pretreatment is performed at a temperature of between 25°C and 200°C for a time period of between 1 minute and 2 hours.

14. **(Previously presented)** The process according to Claim 1, wherein the polymerization is performed at a pressure of between about 1 and about 3 bars of monomer.

15. **(Previously presented)** The process according to Claim 1, wherein the polymerization is performed at a pressure of between about 1.1 and about 2.7 bars of monomer.

16. **(Previously presented)** The process according to Claim 2, wherein, in order to prepare the reaction mixture, the catalyst is added to the suspension of pretreated carbon nanotubes before circulating the flow of monomer in said suspension.

17. **(Previously presented)** The process according to Claim 2, wherein, in order to prepare the reaction mixture, the addition of the catalyst to the suspension of pretreated carbon nanotubes and the circulation of the flow of monomer in said suspension are concomitant.

18. **(Previously presented)** The process according to Claim 1, wherein the carbon nanotubes are selected from the group consisting of single-walled carbon nanotubes, double-walled carbon nanotubes and multi-walled carbon nanotubes, and/or mixtures thereof.

19. **(Previously presented)** The process according to Claim 1, wherein the carbon nanotubes are crude and/or purified carbon nanotubes.

20. **(Previously presented)** The process according to Claim 1, wherein the carbon nanotubes are functionalized carbon nanotubes.

21. **(Previously presented)** The process according to Claim 2, wherein the polymerization reaction is stopped when the rate of polymerization is such that the composite comprises between about 50% and about 99.9% of carbon nanotubes and between about 50% and 0.1% of polymer.

22. **(Previously presented)** The process according to Claim 2, wherein the polymerization reaction is stopped when the nanocomposite formed comprises between about 0.1% and about 50% of carbon nanotubes homogeneously dispersed at the nanoscopic scale in the polymer matrix, and between about 99.9% and 50% of polymer.

23. **(Previously presented)** The process according to Claim 1, further comprising an additional step during which the composite material is used as a masterbatch to prepare a nanocomposite based on a polymer known as an "addition polymer", said addition polymer being miscible and compatible with the polymer of interest of the composite material.

24. **(Withdrawn)** A catalytic system for performing the process according to Claim 1, consisting of carbon nanotubes, a cocatalyst and a catalyst, said catalyst forming with said cocatalyst a catalytic couple, in which said catalyst and said cocatalyst are bound to the surface of said carbon nanotubes.

25. **(Withdrawn- Currently amended)** A composition for performing the process according to Claim 1 and comprising a catalytic system, the catalyst being selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, Brookhart complexes based on Ni (II) and Pd(II), and mixtures thereof, and the cocatalyst being methylaluminoxane or a chemically modified methylaluminoxane, or a mixture thereof, wherein said hindered amidoaryl chelates and said hindered oxoaryl chelates are sterically hindered or are chemically bound and the geometrical conformation of the chelates is thereby constrained.

26. **(Withdrawn)** A composite material obtained by the process according to Claim 1.

27. **(Withdrawn)** The composite material according to Claim 26, comprising between about 0.1% and 99.9% of carbon nanotubes and between about 99.9% and 0.1% of polymer.

28. **(Withdrawn)** The composite material obtained by the process according to Claim 1 and corresponding to a nanocomposite comprising at least one matrix of at least one polymer, in which carbon nanotubes are homogeneously dispersed at the nanoscopic scale.

29. **(Withdrawn)** The composite material according to Claim 28, comprising between about 0.1% and about 50% of carbon nanotubes and between about 99.9% and about 50% of polymer.

30. **(Withdrawn)** The composite material according to Claim 26, wherein the carbon nanotubes are coated with polymer.

31. **(Withdrawn)** A composite material comprising a matrix of at least one addition polymer and the composite material according to Claim 26.

32. **(Cancelled)**

33. **(Currently amended)** A process for polymerizing a monomer[[,]] comprising using the process according to Claim 1, the polymerization reaction being allowed to proceed for

a period sufficiently long so as to have a content of carbon nanotubes of less than 0.1% and a polymer content of greater than 99.9%.

34. **(Withdrawn)** A polymer obtained by the process according to Claim 33.

35. **(Withdrawn)** A catalytic system for performing the process according to Claim 23, consisting of carbon nanotubes, a cocatalyst and a catalyst, said catalyst forming with said cocatalyst a catalytic couple, in which said catalyst and said cocatalyst are bound to the surface of said carbon nanotubes.

36. **(Withdrawn- Currently amended)** A composition for performing a process for obtaining a composite material comprising at least one polymer matrix obtained by polymerization of a monomer referred to as a "monomer of interest" into a polymer, referred to as a "polymer of interest", in the presence of carbon nanotubes homogeneously dispersed in said polymer matrix, said process comprising:

- using said carbon nanotubes as catalysis support to bind homogeneously at the surface thereof a cocatalyst/catalyst couple so as to form a catalytic system, wherein said catalytic system is rendered active for polymerization; and

- polymerizing said monomer at the surface of the carbon nanotubes using said active catalytic system, the polymerization being allowed to progress over time so as thus to obtain said polymer matrix around said carbon nanotubes, as the polymerization of said monomer proceeds; and

- preparing a nanocomposite based on a polymer known as an "addition polymer" from the composite material used as a master batch, said addition polymer being miscible and compatible with the polymer of interest of the composite material,

the process according to Claim 23 and comprising wherein the composite comprises the catalytic system according to Claim 35, the catalyst being selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, Brookhart complexes based on Ni (II) and Pd (II), and mixtures thereof, and the cocatalyst being methylaluminoxane or a chemically modified methylaluminoxane, or a mixture thereof, wherein said hindered amidoaryl chelates and said hindered oxoaryl chelates are sterically hindered or are chemically bound and the geometrical conformation of the chelates is thereby constrained.

37. **(Withdrawn)** A composite material obtained by the process according to claim 23.

38. **(Withdrawn)** The composite material according to claim 37, comprising between about 0.1% and 99.9% of carbon nanotubes and between about 99.9% and 0.1% of polymer.

39. **(Withdrawn)** The composite material obtained by the process according to Claim 23 and corresponding to a nanocomposite comprising at least one matrix of at least one polymer, in which carbon nanotubes are homogeneously dispersed at the nanoscopic scale.

40. **(Withdrawn)** The composite material according to Claim 39, comprising between about 0.1% and about 50% of carbon nanotubes and between about 99.9% and about 50% of polymer.

41. **(Withdrawn)** The composite material according to Claim 37, wherein the carbon nanotubes are coated with polymer.

42. **(Withdrawn)** A composite material comprising a matrix of at least one addition polymer and the composite material according to Claim 37.

43 [[44]]. **(Currently amended)** A process for polymerizing a monomer, comprising using the process according to Claim 23, the polymerization reaction being allowed to proceed for a period sufficiently long so as to have a content of carbon nanotubes of less than 0.1% and a polymer content of greater than 99.9%.

44 [[45]]. **(Withdrawn- Currently amended)** A polymer obtained by the process according to Claim 43 [[44]].